

Vacuum pneumatic conveying calculation input screen

Client: Visanu | File path: c:\V\avis.tbt | Product: CaCO3 Calcium Carbonate

Gas medium: Air Nitrogen

Gas pump:
 Screwcompressor with pre-inlet
 Screwcompressor without pre-inlet
 Predefined screwcompr. with preinlet
 Predef. screwcompr. without pre-inlet
 Blower data with pre-inlet
 Blower data without pre-inlet
 Predefined blower with pre-inlet
 Predefined blower without pre-inlet
 Constant mass vacuum pump (Turbo)

Vac. pump displ: 0,028 m3/sec | Maximum vacuum: 0,65 bar

Feeder/Discharger:
 Bottom/mixing feeder Screw discharge
 Rotary lock

Set Capacity: _____ tons/hr | Capacity: _____ tons/hr | Lock volume: _____ m3 | RPM: _____ /min | Leakage: _____ m3/sec

Ambient (Vacuumpump outlet):
Ambient/intake temperature: 25 degC | Altitude: 0 m
Ambient/starting pressure: 1000 mbar | Altitude pressure: 1013 mbar

Temperatures:
CaCO3 Calcium Carbonate temperature: 40 degC
Heat transmission fact. pipewall: 0,18 kcal/degC/m

Material properties:
CaCO3 Calcium Carbonate
Product density: 2670 kg/m3 | Bulk density: 640 kg/m3 | Particle size: 140 micron | Suspension velocity: 1,2 m/sec
Product loss constant: _____ | Product loss factor: 1,462614E-11 | Wall friction factor: 0,5 | Intake pressure drop suction: 100 mmWC | v-wall / v-susp: 1,5 | Filter resistance factor: 1500000 | Specific heat content: 0,18 kcal/kg/C
 product loss factor constant y/n: n

Filter: Filter area: 10 m2

Convey pipeline:
Convey distance horizontal: 4 m | Convey distance vertical: 6 m-up 0 m-down | Convey distance slope: 0 m-up 0 m-down | Total conveying length: 10 m | Number of Bends: 2
 Intake nozzle with cone: 1 * D
Pipe diameter begin: 54 mm | Pipe diameter end: 54 mm

Calculation settings:
Vacuum system
Set capacity: 3 tons/hr | Set vacuum: 1500 mmWC

Calculation selection:
 Vacuum fixed -> capacity calculated
 Capacity fixed -> vacuum calculated
 Vacuum and capacity fixed -> intake pressure drop calculated
 Vacuum and capacity fixed -> constant cwp calculated
 Vacuum and capacity fixed -> cwp-factor calculated
 product loss factor (cwp) kept constant

Buttons: Back to start menu, Calculate

Calculation Table Vacuum Conveying

Client: Visanu | Filepath: c:\V\avis.tbt | Product: CaCO3 Calcium Carbonate

Convey distance horizontal: 4 m | Convey distance vertical: 6 m | Total conveying length: 10 m | Number of Bends: 2

Pump displ. at 0.65 bar(u): 0,028 m3/sec | Rotarylock leakage: 0 m3/sec | Gas displacement at end: 0,0326 m3/sec | Volumetric efficiency: 87,55 %

Capacity: 3,4 tons/hr | Vacuum: 1500 mmWC | Rotarylock capacity: 0 tons/hr | Pressure drop: 1500 mmWC | Loading ratio: 29,2

Pipeline energy consumption: 0,21 kWh/ton | Vacuum pump power: 0,75 kW | Conveying energy: 0,4 kW | Pneumatic conveying efficiency: 62,4 %

Bend losses: 0 kW | Material intake loss: 0 kW | Re-number * 10⁻⁵: 0,475

Empty pipeline pressure drop: 171 mmWC | Empty pipeline filter press. drop: 14 mmWC | Material constant loss factor: _____ | Material loss factor: 1,46261E-11 | Material intake pressure drop: 100 mmWC

Progress: Filter: [Progress bar] | Iteration: [Progress bar]

Part	Part description	Length(l) m	v-gas m/sec	v-product m/sec	Pressure drop mmWC	v-wall/v-susp	residence time	mass kg	kW	kW%	Bend loss kW	% kW	Sediment
1	Intake 54 hor	1	13,85	12,07	408	3,83	0,091	0	0,1	25,4			
2	Pipe 54 hor	3	13,83	12,45	581	4,01	0,334	0	0	11			
3	Bend		15,85	7,23	581		0,3451	0	0	0	0	10,4	
4	Pipe 54 up	6,01	15,04	12,79	1502	4,18	0,8391	0	0,2	61,6			
5	Bend		17,15	7,54	1503		0,8499	0	0	0	0	10,8	
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7													
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6	Outlet		17,15	7,54	1488		0,8499		0,0048	0			
7	Filter 10 m2		0,1	m/min	1500		0,8499		0,0038	1	dp = 11	mmWC	

Buttons: Back to start menu, Print calculation, Change product, New Calculation, Calculation results

Table calculation

Vacuum conveying

Client: Convey distance horizontal: m
 Filepath: Convey distance vertical: m-up m-down
 Product: Total conveying length: m
 Altitude: m Number of Bends: Pump displacement: m³/sec (Blower)
 Pipe diameter begin: mm Gas volume end: m³/sec
 Pipe diameter end: mm **Two vessel + bottom mixing feeder installation**

MM-DD-YY
09-30-2009

Table

Vacuum bar	Suction capacity tons/hr	Interrupted capacity tons/hr	Solid Loading Ratio SLR	gas velocity begin m/sec	gas velocity end m/sec	System energy consumption kWh/Ton	residence time seconds	Sediment
0.15	3.4	3.3	29.2	13.8	17.1	0.22	0.84	No sedimentation
0.145	3.3	3.3	28.4	13.9	17.1	0.22	0.84	No sedimentation
0.14	3.2	3.2	27.6	14	17	0.22	0.83	No sedimentation
0.135	3.2	3.1	26.7	14.1	17	0.22	0.82	No sedimentation
0.13	3.1	3.1	25.9	14.2	16.9	0.21	0.82	No sedimentation
0.125	3	3	25	14.3	16.9	0.21	0.81	No sedimentation
0.12	2.9	2.9	24	14.3	16.8	0.21	0.81	No sedimentation
0.115	2.8	2.8	23.1	14.4	16.7	0.22	0.8	No sedimentation
0.11	2.7	2.7	22.1	14.5	16.7	0.22	0.79	No sedimentation
0.105	2.6	2.6	21.1	14.6	16.6	0.22	0.79	No sedimentation
0.1	2.5	2.5	20.1	14.7	16.6	0.22	0.78	No sedimentation
0.095	2.4	2.4	19	14.8	16.5	0.22	0.78	No sedimentation
0.09	2.3	2.3	17.8	14.8	16.4	0.22	0.77	No sedimentation
0.085	2.1	2.1	16.7	14.9	16.4	0.24	0.77	No sedimentation
0.08	2	2	15.5	15	16.3	0.24	0.77	No sedimentation
0.075	1.8	1.8	14.2	15.1	16.2	0.26	0.77	No sedimentation
0.07	1.7	1.7	12.9	15.1	16.1	0.26	0.76	No sedimentation
0.065	1.5	1.5	11.5	15.2	16.1	0.28	0.76	No sedimentation
0.06	1.3	1.3	10.2	15.3	16	0.31	0.76	No sedimentation
0.055	1.2	1.2	8.7	15.3	15.9	0.32	0.76	No sedimentation
0.05	1	1	7.3	15.4	15.8	0.37	0.75	No sedimentation

Empty pipeline system pressure drop: mmWC

Buttons: